

Notice of Allowability

Application No.

10/692,129

Applicant(s)

BODIN ET AL.

Examiner

CUONG H. NGUYEN

Art Unit

3661

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 5/15/07.
2. ☒ The allowed claim(s) is/are 1-45; FORMAL DWGS ARE ACCEPTED.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

CUONG H. NGUYEN
Primary Examiner
Art Unit: 3661

DETAILED ACTION

1. This Office Action is the answer to a proposed amendment received on 5/15/2007.
2. Claims 1-45 are pending in this application.

Drawings

3. This application has been filed with formal drawings which are acceptable.

Examiner 's amendment:

4. The authorization for this amendment was given by Mr. Tom Fortenberry (the attorney of the record) on 5/07/2007. Should the changes be unacceptable to applicants, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been agreed to amend as follows:

- In claim 31-32, 34-39, 41, 43-45, these claimed language are made to be statutory:

31. (Currently Amended) A computer program product for navigating an Unmanned Aerial Vehicle (UAV), the computer program product disposed on a computer readable medium and executable on a computer system, the computer program product comprising:

~~means, recorded on the recording medium,~~ for receiving in a remote control device a user's selection of a GUI map pixel that represents a waypoint for UAV navigation, the pixel having a location on the GUI;

~~means, recorded on the recording medium,~~ for mapping the pixel's location on the GUI to Earth coordinates of the waypoint;

~~means, recorded on the recording medium,~~ for receiving downlink telemetry, including a starting position from a GPS receiver on the UAV, from the UAV through a socket on the remote control device;

~~means, recorded on the recording medium,~~ for calculating a heading in dependence upon the starting position, the coordinates of the waypoint, and a navigation algorithm;

~~means, recorded on the recording medium,~~ for identifying flight control instructions for flying the UAV on the heading; and

~~means, recorded on the recording medium,~~ for transmitting uplink telemetry, including the flight control instructions, through the socket to the UAV.

32. (Currently Amended) The computer program product of claim 31 wherein ~~means, recorded on the recording medium,~~ for receiving downlink telemetry further comprises:

~~means, recorded on the recording medium,~~ for listening on the socket for downlink data;

~~means, recorded on the recording medium,~~ for storing downlink data in computer memory; and

~~means, recorded on the recording medium,~~ for exposing the stored downlink data through an API to a navigation application.

34. (Currently Amended) The computer program product of claim 31 wherein transmitting uplink telemetry further comprises:

~~means, recorded on the recording medium,~~ for monitoring computer memory for uplink data from a navigation application; and

~~means, recorded on the recording medium,~~ for sending the uplink data through the socket to the UAV when uplink data is presented.

35. (Currently Amended) The computer program product of claim 31 further comprising:

~~means, recorded on the recording medium,~~ for receiving user selections of a multiplicity of GUI map pixels representing waypoints, each pixel having a location on the GUI;

~~means, recorded on the recording medium,~~ for mapping each pixel location to Earth coordinates of a waypoint;

~~means, recorded on the recording medium,~~ for assigning one or more UAV instructions to each waypoint;

~~means, recorded on the recording medium,~~ for storing the coordinates of the waypoints and UAV instructions in computer memory on the remote control device;

~~means, recorded on the recording medium,~~ for flying the UAV to each waypoint in accordance with one or more navigation algorithms; and

~~means, recorded on the recording medium,~~ for operating the UAV at each waypoint in accordance with the UAV instructions for each waypoint, including:

~~means, recorded on the recording medium,~~ for identifying flight control instructions in dependence upon the UAV instructions for each waypoint; and

~~means, recorded on the recording medium,~~ for transmitting the flight control instructions in the uplink telemetry through the socket from the remote control device to the UAV.

36. (Currently Amended) The computer program product of claim 31 wherein ~~means, recorded on the recording medium,~~ for mapping the pixel's location on the GUI to Earth coordinates of the waypoint further comprises:

~~means, recorded on the recording medium,~~ for mapping pixel boundaries of the GUI map to Earth coordinates;

~~means, recorded on the recording medium,~~ for identifying a range of latitude and a range of longitude represented by each pixel; and

~~means, recorded on the recording medium,~~ for locating a region on the surface of the Earth in dependence upon the boundaries, the ranges, and the location of the pixel on the GUI map.

37. (Currently Amended) The computer program product of claim 36 wherein ~~means, recorded on the recording medium,~~ for locating a region on the surface of the Earth in dependence upon the boundaries, the ranges, and the location of the pixel on the GUI map further comprises:

~~means, recorded on the recording medium,~~ for multiplying the range of longitude represented by each pixel by a column number of the selected pixel, yielding a first multiplicand;

~~means, recorded on the recording medium,~~ for multiplying the range of longitude represented by each pixel by 0.5, yielding a second multiplicand;

~~means, recorded on the recording medium,~~ for adding the first and second multiplicands to an origin longitude of the GUI map;

~~means, recorded on the recording medium,~~ for multiplying the range of latitude represented by each pixel by a row number of the selected pixel, yielding a third multiplicand;

~~means, recorded on the recording medium,~~ for multiplying the range of latitude represented by each pixel by 0.5, yielding a fourth multiplicand;
and

~~means, recorded on the recording medium,~~ for adding the third and fourth multiplicands to an origin latitude of the GUI map.

38. (Currently Amended) A computer program product for navigating an Unmanned Aerial Vehicle (UAV), the computer program product disposed on a computer readable medium and executable on a computer system, the computer program product comprising:

~~means, recorded on the recording medium,~~ for receiving in a remote control device a user's selection of a GUI map pixel that represents a waypoint for UAV navigation, the pixel having a location on the GUI;

~~means, recorded on the recording medium,~~ for mapping the pixel's location on the GUI to Earth coordinates of the waypoint;

~~means, recorded on the recording medium,~~ for transmitting uplink telemetry, including the coordinates of the waypoint, to the UAV through a socket on the remote control device;

~~means, recorded on the recording medium,~~ for receiving downlink telemetry, include a starting position from a GPS receiver, from the UAV through the socket; and

~~means, recorded on the recording medium,~~ for piloting the UAV, under control of a navigation computer on the UAV, from the starting position to the waypoint in accordance with a navigation algorithm.

39. (Currently Amended) The computer program product of claim 38 wherein ~~means, recorded on the recording medium,~~ for transmitting uplink telemetry further comprises:

~~means, recorded on the recording medium,~~ for monitoring computer memory for uplink data from a navigation application; and

~~means, recorded on the recording medium,~~ for sending the uplink data through the socket to the UAV when uplink data is presented.

40. (Currently Amended) The computer program product of claim 38 wherein means, ~~recorded on the recording medium~~, for receiving downlink telemetry further comprises:

~~means, recorded on the recording medium~~, for listening on the socket for downlink data;

~~means, recorded on the recording medium~~, for storing downlink data in computer memory; and

~~means, recorded on the recording medium~~, for exposing the stored downlink data through an API to a navigation application.

43. (Currently Amended) The computer program product of claim 38 further comprising:

~~means, recorded on the recording medium~~, for receiving user selections of a multiplicity of GUI map pixels representing waypoints, each pixel having a location on the GUI;

~~means, recorded on the recording medium~~, for mapping each pixel location to Earth coordinates of a waypoint;

~~means, recorded on the recording medium~~, for assigning one or more UAV instructions to each waypoint;

~~means, recorded on the recording medium~~, for transmitting the coordinates of the waypoints and the UAV instructions in the uplink telemetry through the socket to the UAV;

~~means, recorded on the recording medium~~, for storing the coordinates of the waypoints and UAV instructions in computer memory on the UAV;

~~means, recorded on the recording medium~~, for piloting the UAV to each waypoint in accordance with one or more navigation algorithms; and

~~means, recorded on the recording medium~~, for operating the UAV at each waypoint in accordance with the UAV instructions for each waypoint.

44. (Currently Amended) The computer program product of claim 38 wherein means, ~~recorded on the recording medium~~, for mapping the pixel's location on the GUI to Earth coordinates of the waypoint further comprises:

~~means, recorded on the recording medium~~, for mapping pixel boundaries of the GUI map to Earth coordinates;

~~means, recorded on the recording medium, for identifying a range of latitude and a range of longitude represented by each pixel; and~~

~~means, recorded on the recording medium, for locating a region on the surface of the Earth in dependence upon the boundaries, the ranges, and the location of the pixel on the GUI map.~~

- ~~45.~~ 45. (Currently Amended) The computer program product of claim 44 wherein ~~means, recorded on the recording medium, for locating a region on the surface of the Earth in dependence upon the boundaries, the ranges, and the location of the pixel on the GUI map further comprises:~~

~~means, recorded on the recording medium, for multiplying the range of longitude represented by each pixel by a column number of the selected pixel, yielding a first multiplicand;~~

~~means, recorded on the recording medium, for multiplying the range of longitude represented by each pixel by 0.5, yielding a second multiplicand;~~

~~means, recorded on the recording medium, for adding the first and second multiplicands to an origin longitude of the GUI map;~~

~~means, recorded on the recording medium, for multiplying the range of latitude represented by each pixel by a row number of the selected pixel, yielding a third multiplicand;~~

~~means, recorded on the recording medium, for multiplying the range of latitude represented by each pixel by 0.5, yielding a fourth multiplicand;~~
~~and~~

~~means, recorded on the recording medium, for adding the third and fourth multiplicands to an origin latitude of the GUI map.~~

Allowable Subject Matter & Reason for Allowance

5. Independent claims 1, 8, 16, 23, 31, and 38 are considered patentable over closest cited references of Bodin et al., in view of Nichol et al. (US Pat. 5,986,604), and Rahim (US Pat. 5,155,683), because these references can not be used to reject the claimed subject matter of disclosing a system, a method, and a program product for navigating an unmanned aerial vehicle (UAV), comprising of using:

- means for receiving in a remote control device a user's selection of a GUI map pixel that represents a waypoint for UAV navigation, the pixel having a location on the GUI; and means for mapping the pixel's location on the GUI to Earth coordinates of the waypoint.

Bodin et al.'s references cannot be used to reject this pending invention because of the same assignee. This reference discloses an unmanned aerial vehicle navigating method, involves reading starting position of vehicle from receiver on vehicle, and piloting vehicle from starting position to waypoint, based on navigation algorithm. The method involves receiving a user's selection of a map pixel representing a waypoint for unmanned aerial vehicle navigation, at a remote control device. The pixel is mapped to waypoint coordinates, and the waypoint is transmitted to the UAV. A starting position of the UAV, is read from a GPS receiver on the UAV, and the UAV is piloted from the starting position to the waypoint, based on a navigation algorithm.

Rahim discloses about computer displays the vehicle's intended path on the screen. The path appears as a computer-generated line superimposed on the image of the vehicle's environment, like a stripe painted on the ground. The operator can change or advance the path on the screen with a cursor control. A computer picks certain discrete screen points along the line and maps those screen positions onto ground positions called "way-points". These are sent to the vehicles guidance system to direct the vehicle along a path through the way-points. The transform which maps the screen path onto the ground path depends on the camera orientation and lens. The transform parameters can be adjusted as the camera zooms, pans and tilts. Each time the screen is refreshed, the path line for that

screen is calculated by the computer from the ground path, to present the ground path correctly in the new screen. The operator can extend or modify the path at will.

Nichols et al. teach a survey coordinate transformation method for map-aided navigation system using a selected sum of magnitude of difference between the coordinates of previously surveyed location in second coordinate, and the result of applying the transformation to the previously surveyed location in first coordinate is generated. The adjustable parameter is chosen to minimize the selected sum. This way gives determination in survey locations with greater accuracy. This invention is not in the same field of endeavor.

6. Dependent claims 2-7, 9-15, 17-22, 24-30, 32-37, and 39-45 are allowable since they are dependent on claims 1, 6, 16, 23, 31, and 38.

Conclusion

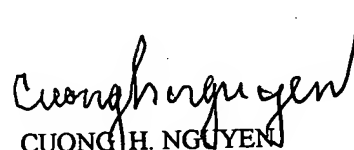
7. Claims 1-45 are patentable.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CUONG H. NGUYEN whose telephone number is 571-272-6759 (email address: cuong.nguyen@uspto.gov). The examiner can normally be reached on 9:30 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, THOMAS G. BLACK can be reached on 571-272-6956. The Rightfax number for the organization where this application is assigned is 571-273-6956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Please provide support, with page and line numbers, for any amended or new claim in an effort to help advance prosecution; otherwise any new claim language that is introduced in an amended or new claim may be considered as new matter, especially if the Application is a Jumbo Application.


CUONG H. NGUYEN
Primary Examiner
Art Unit 3661